The Metropolitan Mobility Observatory (MMO)

The objective of the present document is to summarize the information contained in the 2015 MMO Report, developed by TRANSyT-UPM analyzing the data provided by its members and collaborators.

The MMO is an analysis and observation initiative made up of the Public Transport Authorities (PTA) of the main Spanish metropolitan areas, the Ministry for Agriculture and Fisheries, Food and Environment, the Ministry of Public Works and Transport, the Institute of Energy Diversification and Savings and the Directorate General of Traffic. It collaborates very closely as well with the National Railway Operator (RENFE), the Association of Collective Urban Transport (ATUC), the Spanish Federation of Municipalities and Provinces (FEMP) and the CCOO Trade Union Federation.

Its main goal is to reflect the contribution of public transport to the improvement of the quality of life and sustainable development in the Spanish cities. This contribution is reflected in the analysis of the general mobility tendencies of the main metropolitan areas, which is done through the study of a set of key transport indicators including public transport supply and demand, financing and investments, quality of service and road safety.

For the 2015 MMO Report, 21 PTA* (out of 24 included in the MMO) provided information, which represents approximately the 52% of the nation’s population. The rest of the information was provided by usual collaborators of the MMO, like RENFE, the Directorate General of Traffic and the National Statistics Institute.

Main Figures

The following figures summarise some important information about the urban and metropolitan mobility in 2015 in the 21 participating metropolitan areas:

- The annual public transport demand for the 17 areas considered in the report is 23,981 billion passenger-km (35% for bus and 65% for rail modes).
- The number of journeys per inhabitant per year differs according to the size of the metropolitan area. The average is 120 journeys per inhabitant per year in large areas and 49 journeys in mid-sized and small areas.
- A total of 3,340 billion public transport journeys were made, 1.645 billion by bus and 1.695 billion by rail modes. In spite of the similarity of both figures, it is remarkable the great difference between the lengths of the network that support these journeys: 107,317 km for bus lines and 3,285 km of rail network.
- Investment in public transport in 2015 reached 695.8 million euros. It is significant the amount of these investments dedicated to rail modes, 65%.
- The public transport supply is about 596 million vehicle-km for bus services and 316 million car-km for rail modes (not included Cercanias RENFE).
- The average coverage ratio is 52%. While metropolitan area transport systems which include rail modes have an average coverage ratio of 45%, those which consist exclusively of buses present an average of 57% coverage.

This summary illustrates key findings on the diversity of public transport systems and public transport policies in the largest Spanish metropolitan areas.

For more on previous editions, see the publications section of www.observatoriomovilidad.es.
Evolution of population and other socioeconomic indicators

As it can be appreciated in the following figure, the population in the periphery has generally increased between 2008 and 2015 an 8.8%, as well as the population in the metropolitan area, which has also been increased but in a lower rate (3.8% in the period). Asturias is the only area with a decline in its whole metropolitan area (-2.7%). Moreover, we can find a different situation in the population in main cities, as its general population has suffered a slight decrease of 0.6% in the period. This is due to the negative growth found in cities like Madrid, Valencia, Cadiz, Tarragona or Leon.

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Variation of population in metropolitan areas between 2008 and 2015

*Seville, Malaga, Cadiz Bay and Granada have incorporated other municipalities into their jurisdiction over the years, which has caused major population variations.
**Lleida and Campo de Gibraltar, variation between 2009 and 2015.
***The loss of population in Tarragona is due to segregation of Canonja township in 2010.
**** Leon, variation between 2010 and 2015.
Source: compiled by authors based on data provided by the PTAs.
The economic crisis in recent years has influenced very strongly the growing unemployment rate in almost all metropolitan areas since 2008. In 2015 the average unemployment rate in the areas considered is about 22.8%, lower than 2015 and the national average (20.9%).

The effects and consequences of this economic crisis could be seen in the slight decline of the motorisation rate since 2008. The next figure shows that all cities have reduced the motorisation rate between 2008-2015, except Palma Majorca, Cadiz and Pamplona. In 2015, the number of cars per 1,000 inhabitants, on average, was 435 in the cities; whereas it was 468 in the metropolitan areas.

Variation of the motorisation rate in cities (2008-2015)

![Variation graph]

Modal Split

In trips for all motives, the average modal share for public transport in the metropolitan areas is more than 13%; however, in Madrid, it reaches a 28.4% while in Cadiz Bay it is 4.1%.

On average, active modes (walking and cycling) account for 44% of the trips and private cars and motorcycles for 43%. It is remarkable the case of the two main big cities, since Barcelona has a rate of 56.1% in active modes and Madrid accounts for a 37.8% of public transport trips. Those two cities show two different characteristics, while in the first one exists a deep-rooted habit of walking/biking, in the second one it is highlighted the high use of the public transport system.

![Modal share of trips graph]

- Modal share of trips in main city and in whole PTA area.
Demand for Public Transport

If we consider the variation of the public transport demand between 2002 and 2015, two phases can be distinguished. First, the variation between 2002 and 2007 shows a general growth of a 12.7% in public transport demand, specially in rail modes journeys (22.6%) against the bus journeys (3.3%). And, second, the variation between 2008 and 2015 shows an overall decrease of 7.2% in public transport demand, according to the economic crisis, despite the slight rise in the last year (1.5%)

Variation of public transport journeys between 2002 and 2015

Evolution of public transport journeys as compared to population

Public Transport Supply

The supply of bus services (in terms of vehicles-km) has decreased over the years in most metropolitan areas since 2012. In 2015 the supply of bus services has slightly increased. Concerning the bus networks density, the average is 4.6 km per 1,000 inhabitants, being Asturias and Majorca much above this value, with more than 10 km per 1,000 inhabitants, due to their special support to this mode of public transport. Relating route density with surface area, Corunna, Barcelona and Leon reach the highest figures, with 9 km/km², 8.9 km/km² and 4.4 km/km², respectively.

Since rail transports cover long distances as they are more efficient, the rail network density is higher for larger population’s areas. The average in Spain is 141 km length per million inhabitants and 78 km per 1,000 km², an average which is exceed in the case of Asturias due to the great length of FEVE commuter lines with a density of 366 km per million inhabitants, or in Valencia, with 264 km per 1,000 km².
• **Bus Lanes**

Buses operate most of the time in mixed traffic, so in order to be competitive with respect to cars, to improve their service and in matter of effectiveness, it is necessary to reserve space in the streets for its exclusive use, especially if they have a physical protection. In 2015, Barcelona presents the highest length of bus lane in its road network (160.8 km), although Valencia is the city showing the highest ratio of bus lanes respect to its total bus network (22.4%). They are followed by Seville, with a 13.3% of bus lanes on its road network, mostly with protection.

*Length of bus lanes in main city (2015)*

Source: compiled by authors based on data provided by the PTAs.
• Bicycle Lanes

In order to promote an eco-friendly alternative way of transport it is important to improve the facilities of the bicycle in the cities, creating bicycle lanes on roads where traffic and speed of the vehicles are exceeding the limits. Therefore in the streets it is possible to find segregated and non-segregated bicycles lanes as well as mixed traffic streets, where cycling is allowed but it is not as safe as in the previous ones.

As seen in the following figure, bicycle lanes of all types have been increased among the years in Spain, especially due to the development of different public sharing systems, as it is the case of the city of Madrid.

### Percentage of bus network with bus lanes in main city (2015)

<table>
<thead>
<tr>
<th>City</th>
<th>Segregated</th>
<th>Non-segregated</th>
<th>Shared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Madrid</td>
<td>6.7%</td>
<td>16.9%</td>
<td>22.7%</td>
</tr>
<tr>
<td>Barcelona</td>
<td>0.8%</td>
<td>5.7%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Valencia</td>
<td>13.3%</td>
<td>5.7%</td>
<td>22.7%</td>
</tr>
<tr>
<td>Seville</td>
<td>0.8%</td>
<td>5.7%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Oviedo</td>
<td>0.8%</td>
<td>5.7%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Malaga</td>
<td>0.8%</td>
<td>5.7%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Majorca</td>
<td>0.8%</td>
<td>5.7%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Saragossa</td>
<td>7.1%</td>
<td>1.4%</td>
<td>0.8%</td>
</tr>
<tr>
<td>San Sebastian</td>
<td>1.4%</td>
<td>0.8%</td>
<td>5.7%</td>
</tr>
<tr>
<td>Pamplona</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

**Source:** compiled by authors based on data provided by the PTAs.

### Length of the bicycle lanes in the main city (2015)

- **Segregated bicycle lanes (km)**
- **Non-segregated bicycle lanes (km)**
- **Shared lanes (km)**

### Public bicycle service in Saragossa

- **Segregated bicycle lane in Madrid**
Economic and fare-based aspects

• Ticket and fare types
Fare types are different among some of the metropolitan areas due to the different systems employed: concentric ring fare systems, as Madrid or Seville, or fare zones dividing the region, as Barcelona or Malaga. Concerning ticket supply, the single ticket is the only one common for all the Spanish cities, as for the rest there can be found a huge range of different tickets, each one with its specific fare. One of them is the monthly pass, which is mainly used in Madrid by a 72% of the users, while in other cities it is being used a smart card that allows the user to buy single trips with some discount, being the favourite type of ticket in Pamplona, Jaen and Gipuzkoa, used by a 79%, a 78% and a 70% of the users, respectively.

• Coverage ratio
The percentage of operating costs covered by fare revenue (coverage ratio) reached on average a 53% in 2015. In general, metropolitan areas with rail modes present lower ratios (48%) than those without rail modes (58%). The outstanding cases are in the one hand, Corunna and Cadiz Bay, with ratios of 77% and 74%, respectively, and in the other hand, Lleida with a ratio of 27%. Finally, it is remarkable that Spanish results are better than European results, where the coverage ratio is on average 48% according to the EMTA Barometer, five points lower than Spanish one.

Quality of the PT Services
In recent years, users increasingly demand a high quality public transport system. Thus, the quality of the service must be revised and improved frequently, involving some factors such as:

• Frequency at peak times: 3-5 minutes for metro services, 9-15 minutes for urban buses, 15-20 minutes for metropolitan buses and 5-7 minutes for suburban railways in Madrid and Barcelona.

• Night services: Generally it is easy to find night bus services during the week in the larger cities and at weekends in the rest of the cities.

• Accessibility for disabled: it is very developed in urban buses and trams services, where 100% of the fleet have facilities for this sector of the population.

Coverage ratio for PT systems in metropolitan areas (2015)

<table>
<thead>
<tr>
<th>City</th>
<th>Coverage Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Madrid</td>
<td>51%</td>
</tr>
<tr>
<td>Barcelona</td>
<td>57%</td>
</tr>
<tr>
<td>Valencia</td>
<td>56%</td>
</tr>
<tr>
<td>Seville</td>
<td>52%</td>
</tr>
<tr>
<td>Asturias</td>
<td>56%</td>
</tr>
<tr>
<td>Malaga</td>
<td>51%</td>
</tr>
<tr>
<td>Majorca</td>
<td>37%</td>
</tr>
<tr>
<td>Saragossa</td>
<td>42%</td>
</tr>
<tr>
<td>Gipuzkoa</td>
<td>55%</td>
</tr>
<tr>
<td>Cadiz Bay</td>
<td>74%</td>
</tr>
<tr>
<td>C. Tarragona</td>
<td>37%</td>
</tr>
<tr>
<td>Granada</td>
<td>59%</td>
</tr>
<tr>
<td>Alicante</td>
<td>37%</td>
</tr>
<tr>
<td>Lleida</td>
<td>27%</td>
</tr>
<tr>
<td>Pamplona</td>
<td>67%</td>
</tr>
<tr>
<td>C. Gibraltar</td>
<td>67%</td>
</tr>
<tr>
<td>Corunna</td>
<td>77%</td>
</tr>
<tr>
<td>León</td>
<td>57%</td>
</tr>
<tr>
<td>Cáceres</td>
<td>51%</td>
</tr>
</tbody>
</table>

Not included data from Renfe services. Asturias, Malaga, Gipuzkoa, Lleida only urban bus. Saragossa and Cadiz Bay only metropolitan bus. Source: data provided by the PTAs.
MEMBERS AS OF 1 JANUARY 2015

PUBLIC TRANSPORT AUTHORITY

Consorcio Regional de Transportes de Madrid
Autoritat del Transport Metropolità de Barcelona
Consellería de Infraestructuras, Territorio y Medio Ambiente - S.G. de Planificación, Logística y Seguridad
Consorcio de Transporte Metropolitano Área de Sevilla
Consorcio de Transportes de Bizkaia
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Ayuntamiento de A Coruña
Autoritat Territorial de la Mobilitat Área de Lleida
Ayuntamiento de León
Consorcio de Transporte Metropolitano del Área de Jaén
Ayuntamiento de Cáceres

REGION

Community of Madrid
Barcelona Metropolitan Region
Metropolitan Area of Valencia
Metropolitan Area of Seville
Province of Bizkaia
Asturias Region
Malaga Metropolitan Area
Mallorca
Gran Canaria
Metropolitan Area of Zaragoza
Province of Gipuzkoa
Cadiz Bay
Camp de Tarragona
Granada Metropolitan Area
Almeria Metropolitan Area
Alicante Metropolitan Area
Pamplona Region
Municipality of Vigo
Gibraltar Camp
Girona Metropolitan Area
Municipality of Corunna
Municipality of Lleida
Municipality of Leon
Jaen Metropolitan Area
Municipality of Caceres

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